capability of the generator is the load level the generator can support on a continuous bases. To make full use of the generator's surge and continuous capabilities, the generator monitor 10 calculates and reports a GAP Surge (GAPS) and a GAP Continuous (GAPC) level. Figure 2 shows a Generator monitor 10 and Figure 3 provides a flow diagram of the generator monitor process. Alternative designs are possible with the removal or addition of certain features discussed below providing control over the device cost or device installation complexity.

With reference to the side and front views of Figure 2, generator monitor 10, in accordance with one embodiment of the present invention, includes twist lock connectors, of socket 110 and plug 111, which is readily installable at the end of the generator cable used to connect the generator to the home circuit panel. In alternative embodiments, the generator monitor can interface with the electrical system at a plurality of locations, such as integrated into the home circuit panel, or built into the generator by the manufacturer where the generator monitor can measure the momentary power from the generator 11. The generator monitor 10 includes an antenna 112 for transmitting via radio waves, to the other devices in the system. Other methods of communication such as other wireless bandwidths, wire, and fiber optic, are equally applicable to the present invention. This generator monitor 10 in Figure 2, includes a display screen 131 with input controls for setting reference outputs (Ref. Watts) 140 and the time of day 141. The generator monitor 10 further includes input controls for incrementing up 142 and decrementing 143 the values of reference loads, and the hours, minutes and seconds for setting time of day. The user can input multiple reference load levels for surge and continuous capabilities and control changes in these load levels based on time of day. The input controls permit the user to set the generator monitor's clock, which is used to control the changes in reference capacities.

Figure 3 is a flow diagram of a process run in the generator monitor 10. Initially during step 150, a user inputs a Surge Power Delay value and Continuous Power Delay value. These values are used to delay the reporting of a full GAP capability when the generator or power source is first started, to allow the power source a time frame in which to warm

up. It is well known that many combustion engine manufacturers recommend that the engine be allowed to run for a brief period of time, ranging from a few seconds to a few minutes before operating the engine at full power. This time period is often intended to allow the engine to establish oil pressure and establish reasonable operating temperatures in some or all of its engine parts. In the case of fuel cells, an initial warm up period is required to bring the cells up to an efficient operating temperature where output voltage and amperage stabilize at or near design intent. Independent of the technical reasons for delaying the load applied to the power source, the use of the surge and continuous power delay factors can be used to accommodate this delay. The levels of power reduction from full rated capacity are defined by SPD1 and CPD1 in step 150 of Figure 3. The value of TW or Time to Warm up, is also set in 150. These delay values are subtracted from the calculated GAP levels until the time since generator start or "Time" in 156 is greater than TW, at which point SPD1 and CPD1 are set to zero and do not further effect the GAP levels calculated.

The embodiment of the invention can prioritize the power from the generator by setting varying levels of reference outputs. GAP levels are be calculated from reference outputs set at levels equal to or less than the generator's rated surge and continuous capacities. Lower priority appliances are controlled by GAP levels calculated from reference outputs that are lower than the rated capacity of the generator. Lower reference outputs, cause lower calculated GAP levels and the devices of the invention monitoring these lower GAP levels have lower priority access to the generator's power. Surge reference outputs are referred to as SR and continuous reference outputs are referred to as CR. Gradually lower levels of surge and continuous reference outputs are identified with trailing numbers SR1, CR1, SR2, CR2, SR3, CR3, etc.,

Three levels of surge reference and continuous reference 151, 152, 153 are determined and set. Alternative generator monitor embodiments may include more or less than three sets of surge reference output and continuous reference output levels. A user can also set the generator monitor clock 155 that governs changes in the reference outputs with time of day. With higher power generators, a homeowner will find that there is some

flexibility in the allocation of the generator's capacity. For this purpose, thegenerator monitor 10 can use multiple reference outputs for calculating multiple surge and continuous GAP levels. The user can then set the other devices in the system to execute their decision process relative to one of the GAPS and GAPC levels transmitted from the generator monitor 10. The setting of different reference outputs allows the user to assign priority levels to appliances. This priority setting will be explained in more detail below, in connection with the descriptions of the other devices in the system and with implementation examples at the end of the detailed description. It is important to note that the setting of reference outputs need only be done once at installation. If the generator monitor is equipped with battery power, for powering the clock, the setting of the clock need only be done once at installation. Other than the potential need to set the clock, the presence of the generator monitor 10 does not introduce any additional management tasks when utility power fails and the generator is brought on line.

As shown in Figure 3, the generator monitor measures the momentary load (ML) on the generator 157. The data values for ML and SPD1 (or CPD1), ML and SPD2 (or CPD2) and ML and SPD3 (or CPD3) are then subtracted from the surge reference output and continuous reference output levels previously set by the user, at steps 158, 159 and 160 respectively. The differences represent the generator's latent capacities or Generator Available Power levels for the given reference outputs. The invention now calculates three sets of GAP levels (GAPS1, GAPC1, GAPS2, GAPC2, GAPS3, GAPC3, etc.) which are Generator Available Power levels for three levels of reference outputs or priorities for three different groups of appliances. The three sets of GAP levels are transmitted via transmission 17 (see figure 1) to the other devices in the system, at steps 161, 162 and 163. Note that the values of SPD1 and CPD1 are greater than zero step 156 for a short period of time as noted above, in order to lower the GAP levels initially following startup of the power source. This serves to lower the total load applied to the power source during initialization and warm up. The generator monitor process flow of Figure 3 goes on to repeat the measuring and transmitting of GAP levels at an interval similar to the response time of the system. The response time may be on the order of the time it takes for the generator monitor 10 to measure the momentary load, calculate GAP